NASA SBIR/STTR Technologies

H8.01-8888 - Ultra-Compact Heat Rejection System for Fission Surface Power

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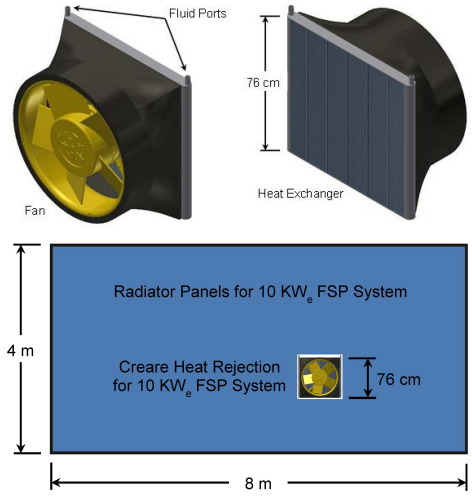
Identification and Significance of Innovation

Radiator panels are the baseline approach for rejecting waste heat from NASA Fission Surface Power (FSP) systems. The required panels are very large, which makes them challenging to launch, deploy, support, and move. Panel performance may also be degraded by dust, radiation, insolation, and micrometeorite impact. In response, we propose to develop an ultra-compact heat rejection system that relies on forced convection rather than radiation heat transfer. It will decrease power system size and mass dramatically, which will make FSP more affordable and practical.



Estimated TRL at beginning and end of contract: (Begin: 2 End: 3)

Technical Objectives and Work Plan

Objectives:
1. Optimize design trades.
2. Develop preliminary design.
3. Determine mass and size.
4. Predict power consumption.
5. Fabricate bearing assembly.
6. Characterize bearing operation.
7. Assess technical risks.

Tasks:
1. Trade Studies
2. Fan, Motor, and Electronics Design
3. Heat Exchanger Design
4. System Assembly Design
5. Bearing Fabrication and Testing
6. Management and Reporting

NASA Applications

Heat rejection systems for Fission Surface Power (FSP), manned rovers, In-Situ Resource Utilization (ISRU) systems, and unmanned exploration landers.
Core technology elements applied to air handling systems, energy storage flywheels, turbomachines, gas turbine engines, and compact heat exchangers.

Non-NASA Applications

Military and civilian mobile electric generators, aircraft, land vehicles, and watercraft.
HVAC Systems for military, industrial, commercial, and home use.

Firm Contacts

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